



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,966	09/30/2003	Frederick M. Disenzo	01AB175C/ALBRP246USC	4946
7590 Susan M. Donahue Rockwell Automation, 704-P, IP Department 1201 South 2nd Street Milwaukee, WI 53204				
EXAMINER ORTIZ RODRIGUEZ, CARLOS R				
ART UNIT 2123		PAPER NUMBER		
MAIL DATE 05/11/2009		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/674,966

Applicant(s)

DISCENZO ET AL.

Examiner

CARLOS ORTIZ RODRIGUEZ

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/13/09.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 13, 15-17 and 19-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13, 15-17 and 19-49 is/are rejected.
- 7) ☒ Claim(s) 1, 4-6, 8-10, 15, 22, 33, 40, 44 and 47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1-10, 12-13, 15-17, 19-49 are pending.
2. Claims 11, 14 and 18 are cancelled.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/13/09 has been entered.

Response to Arguments

4. Applicant's arguments filed 2/13/09 have been fully considered but are moot in view of the new ground(s) of rejection.

Claim Objections

5. (Claim 1 Line 4) objected to because of the following informalities: The term "prognostics engine" would be better if written as "prognostic engine", in order to maintain consistency throughout the claims (see for example Claim 2 Line 2). Appropriate correction is required.

6. (Claim 1 Line 9) (Claim 47 Line 7) objected to because of the following informalities: The term "optimizing industrial business operations" would be better if written as "optimizing **the** industrial business operations", in order to clearly indicate that the "industrial business operations" are the same operations previously recited in the preamble of the claim. Appropriate correction is required.

7. (Claim 1 Line 13) (Claim 44 Line 13) objected to because of the following informalities: The term "and controls at least one component" creates confusion as to whether the "at least one component" being controlled is: the "component that receives data" (see for example Claim 1 Line 2) or one of the component of the "subset of components" (see for example Claim 1 Lines 2-3). It is understood that Applicant's intention might be to recite this limitation using the broadest possible language. However, please note that since the term "component" is used throughout the claim to refer to more than one different component, it would be better if the specific component being controlled is recited, in order to avoid confusion. Appropriate correction is required.

8. (Claim 4 Line 1) (Claim 6 Line 2) (Claim 8 Line 1) (Claim 9 Line 1) objected to because of the following informalities: The term "a subset of the machines" would be better if written as "the subset of machines", in order to clearly indicate that it is referring

to the previously mentioned "subset of machines" (see for example Claim 1 Line 2).

Appropriate correction is required.

9. (Claim 5 Line 1) objected to because of the following informalities: The term "prognostics components" would be better if written as "prognostic components", in order to maintain consistency throughout the claims (see for example Claim 4 Line 1-2). Appropriate correction is required.

10. (Claim 6 Line 1) objected to because of the following informalities: The term "prognosis engine" would be better if written as "prognostic engine", in order to maintain consistency throughout the claims (see for example Claim 2 Line 2). Appropriate correction is required.

11. (Claims 8 and 9, Line 1 respectively) objected to because of the following informalities: The term "machines and/or components" would be better if written as "machines or components", in order to maintain consistency throughout the claims (see for example Claim 1 Lines 2-3). Appropriate correction is required.

12. (Claim 10 Line 4) (Claim 33 Lines 4-5) objected to because of the following informalities: The term "industrial automation system" would be better if written as "industrial automation environment", in order to maintain consistency throughout the claims (see for example the preamble of the claim). Appropriate correction is required.

13. (Claim 10 Line 15) objected to because of the following informalities: The term "at least one machine" would be better if written as "at least one of the machines", in order to clearly indicate that it is referring to the previously mentioned "machines" (see for example Claim 10 Line 6). Appropriate correction is required.

14. (Claim 15 Line 2-3) (Claim 22 Line 1) objected to because of the following informalities: The term "wherein controlling the system according to" would be better if written as "wherein controlling the at least one of the machine according to", in order to maintain consistency throughout the claims (see for example Claim 10 Line 15). Please note that "controlling at least one machine" is previously mentioned, but "controlling the system" is not mentioned. Appropriate correction is required.

15. (Claim 40 Line 12) objected to because of the following informalities: The term "a allowable" appears to be "an allowable". Appropriate correction is required.

16. (Claim 44 Line 3) objected to because of the following informalities: The term "to state" appears to be "to a state". Appropriate correction is required.

Claim Rejections - 35 USC § 112

17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. Claims 1-9, 15, 20, 21, 22, 24-36, 38, 39 and 44-49 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically:

- a. (Claim 1 Lines 12-13) (Claim 44 Line 12-13) and (Claim 48 Lines 2-3) recites the term "the system". It is not clear if this term ("the system") is referring to the "system" mention in the preamble of the base claim or if it is referring to the "system" implied from the term "a system set point" mentioned later in the base claim.
- b. (Claim 15 Lines 2-3) recites the limitation "the motor drive". There is insufficient antecedent basis for this limitation in the claim.
- c. (Claim 20 Line 3) (Claim 21 Line 4) (Claim 22 Line 2) (Claim 27 Line 3) (Claim 29 Line 1 and 6) (Claim 30 Lines 1 and 4) (Claim 31 Lines 1 and 4) (Claim 32 Line 2) recites the term "the system". It is not clear if this term ("the system") is referring to the "industrial automation system" (mention in the Claim 10 Line 4) or if it is referring to the "system" implied from the term "a system set point" (mentioned in Claim 10 Line 13).

d. (Claims 21, 22 and 24-29) are unclear because base claim 21 recites the limitation "selecting the desired operating point as the **optimum performance point** within the allowable range of operation according to the correlated system performance information", in lines 5-6. Note that base Claim 10 recite the limitation "selecting a desired operating point as an **optimum efficiency point** within an allowable range of operation about a system set point according to the correlated system efficiency information", in lines 12-14. It is not clear how the "desired operating point" is selected to be both the "optimum efficiency point" and the "optimum performance point". Therefore, dependent claims 22 and 24-29 are unclear for the same reason.

e. (Claim 30 Line 3) (Claim 31 Line 3) recites the limitation "the performance characteristics". There is insufficient antecedent basis for this limitation in the claim.

f. (Claim 33 Line 9) recites the limitation "the analyzed diagnostic and prognostic machine data". There is insufficient antecedent basis for this limitation in the claim.

g. (Claim 38 Line 5) recites the limitation "the operations concerning a machine". There is insufficient antecedent basis for this limitation in the claim.

h. (Claim 38 Lines 7-8) recites the limitation "the components in the system".

There is insufficient antecedent basis for this limitation in the claim.

i. (Claim 39 Lines 9-10) (Claim 47 Lines 10-11) recites the limitation "the components in the system". There is insufficient antecedent basis for this limitation in the claim. Additionally please correct the phrase "at least one component" (mentioned in the last limitation), accordingly.

j. (Claim 47 Lines 6-7) recites the limitation "the subset of machines". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

19. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

20. Claim 1, 3-9, 33-35, 38 and 44-49 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

a. Note that the preamble of **system** claims 1, 3-9, 33-35 and 44-49 provides for a system and the body of these claims provide for components. However, it appears reasonable to interpret these systems and/or components as software per se because Applicant's specification indicates that the terms "system" and "components" are intended to refer to software (see for example Page 14 Lines 14-21). Additionally, as evident from dependent claim 2, a "prognostic engine" is a software/program because the "prognostic engine" is executed by a host computer. Also, as evident from claim 36, the components of claim 1 are software/programs because the components of claim 1 are stored in a computer readable medium. Note that software per se is nonstatutory functional descriptive material.

b. Furthermore, regarding **system** claims 33-35, note that these system claims contain "means plus function" language. These recited means can be reasonable interpreted as software per se because Applicant's specification indicates that the term "system" is intended to refer to software (see Page 14 Lines 14-21). In response to this rejection Applicant should point out the particular structures or materials disclosed in the specification and/or "equivalents thereof" that correspond to the recited functions.

c. Regarding claim 38, note that claim 38 was amended in a manner that further defines the environment where the computer processes are being

performed but does not overcome the rejection under 35 U.S.C. 101 because claim 38 is claiming "a data packet" that comprises a "data field". Please note that a "data packet" is being considered as "a group of information to be transmitted". "A data packet " is not a process, machine, manufacture, or composition of matter, or any new and useful improvement thereof. If Applicant's intention is to claim a method then the preamble of the claim must be amended to properly provide for a method and the body of the claim must be amended to include the method steps involved in transmitting this data packet; additionally the body of the claim must positively recite the particular apparatus performing the method steps. If Applicant's intention is to claim a system, then the preamble of the claim must be amended to properly provide for a system and the body of the claim must include system elements that will structurally define the system.

Also note that the body of the claim 38 is merely nonfunctional descriptive material. Any other type of information may be included in the "data field" and would not alter the ability of the "data packet" to be "transmitted between at least two computer processes running on a machine-implemented system". In other words the body of the claim merely provides for a "data field" comprising "data that is enabled to regulate" based on "other data". The actual step of "regulating operation of a business component" or the actual physical structure that is used to "regulate the operation of a business component" is not positively claimed.

Double Patenting

21. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

a. Claim 10 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 13 of U.S. Patent No. 6,847,854 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 13 of U.S. Patent No. 6,847,854 does not recite modeling and representing interactions of the subset of machines, for facilitating convergence on modification and control of the subset of machines.

However, Reid teaches modeling and representing interactions of the subset of machines, for facilitating convergence on modification and

control of the subset of machines (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 13 of the 6,298,308 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

b. Claim 39 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 12, of U.S. Patent No. 6,847,854 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 12 of U.S. Patent No. 6,847,854 does not recite analyzing machine related prognostic data; analyzing business concern data; analyzing business objective data; and specifying machine acquisition based at least in part upon the analyses.

However, Reid teaches analyzing machine related prognostic data (C3 L13-44 and C5 L3-21, see for example automatic collecting and analyzing data related to predicting a future condition); analyzing business concern data (C3 L20-25; note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business concern data); analyzing business objective data (C3 L20-25, note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business objective data); specifying machine acquisition based at least in part upon the analyses (C3 L20-25, see for example specifying part numbers of the bearings that need to be replaced).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of

claim 12 of the 6,847,854 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

c. Claim 10 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 7 of U.S. Patent No. 7,050,873 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 7 of U.S. Patent No. 7,050,873 does not recite modeling and representing interactions of the subset of machines, for facilitating convergence on modification and control of the subset of machines.

However, Reid teaches modeling and representing interactions of the subset of machines, for facilitating convergence on modification and control of the subset of machines (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such

information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 7 of the 7,050,873 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

d. Claim 39 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 3 of U.S. Patent No. 7,050,873 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 3 of U.S. Patent No. 7,050,873 does not recite analyzing machine related prognostic data;

analyzing business concern data; analyzing business objective data; and specifying machine acquisition based at least in part upon the analyses.

However, Reid teaches analyzing machine related prognostic data (C3 L13-44 and C5 L3-21, see for example automatic collecting and analyzing data related to predicting a future condition); analyzing business concern data (C3 L20-25; note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business concern data); analyzing business objective data (C3 L20-25, note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business objective data); specifying machine acquisition based at least in part upon the analyses (C3 L20-25, see for example specifying part numbers of the bearings that need to be replaced).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 3 of the 7,050,873 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

e. Claims 1, 44 and 47 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 21 and 31 of U.S. Patent No. 7,143,016 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 21 and 31 of U.S. Patent No. 7,143,016 does not recite a component that receives data relating to at least one state of a subset of machines or components that are part of the industrial business operations; a prognostics engine that infers at least one future state of at least a subset of the operations based in part on the received data, the prognostics engine comprising a plurality of intelligent software machine agents and business agents that serve as proxies for at least the subset of machines for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing industrial business operations.

However, Reid discloses a component that receives data relating to at least one state of a subset of machines or components that are part of the industrial business operations (C3 L32-34, see for example data collecting and analyzing); a prognostics engine that infers at least one future state of at least a subset of the operations based in part on the received data (C2 L54-64, note that the local experts are being interpreted

as the "prognostic engine"; and a "forecast or prediction" is being interpreted as a "prognostic". The diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc), the prognostics engine comprising a plurality of intelligent software machine agents and business agents that serve as proxies for at least the subset of machines for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing industrial business operations (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general

terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 21 and 31 of the 7,143,016 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

f. Claims 33 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 32 of U.S. Patent No. 7,143,016 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims share common limitations but are not identical and are not patentably distinct. Claim 32 of U.S. Patent No. 7,143,016 does not recite means for receiving and analyzing in real-time data relating to prognoses of operational aspects of machines and/or business components that are part of the industrial automation system; means for modeling and representing interactions between the machines and/or business; and means for regulating a subset of the machines

and/or business components based at least in part as a function of the analyzed diagnostic and prognostic machine data.

However Reid teaches means for receiving and analyzing in real-time data relating to prognoses of operational aspects of machines and/or business components that are part of the industrial automation system (C3 L32-34, see for example data collecting and analyzing); means for modeling and representing interactions between the machines and/or business components (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet); means for regulating a subset of the machines and/or business components based at least in part as a function of the analyzed diagnostic

and prognostic machine data (C3 L20-25, replacing a part of a machine based on data identified by the local expert is being considered as regulating machines and/or business components).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 32 of the 7,143,016 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

g. Claims 39 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,143,016 in view of Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid).

i. The conflicting claims are not identical, but share common limitations. Claim 1 of U.S. Patent No. 7,143,016 does not recite analyzing machine related prognostic data; analyzing business concern data; analyzing business objective data; and specifying machine acquisition based at least in part upon the analyses.

However, Reid teaches analyzing machine related prognostic data (C3 L13-44 and C5 L3-21, see for example automatic collecting and analyzing data related to predicting a future condition); analyzing business

concern data (C3 L20-25; note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business concern data); analyzing business objective data (C3 L20-25, note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business objective data); specifying machine acquisition based at least in part upon the analyses (C3 L20-25, see for example specifying part numbers of the bearings that need to be replaced).

Therefore, at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of claim 1 of the 7,143,016 patent and combining them with the teachings disclosed by Reid.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce delays due to data transfer at critical moments as suggested by Reid (see for example, C13 L8-12).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 1, 2, 4-6, 8-9, 36, 39, 44, 45 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays).

a. **Regarding claims 1 and 36**, Reid discloses a system that optimizes industrial business operations, comprising: a component that receives data relating to at least one state of a subset of machines or components that are part of the industrial business operations (C3 L32-34, see for example data collecting and analyzing); a prognostics engine that infers at least one future state of at least a subset of the operations based in part on the received data (C2 L54-64, note that the local experts are being interpreted as the "prognostic engine"; and a "forecast or prediction" is being interpreted as a "prognostic". The diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc), the prognostics engine comprising a plurality of intelligent software machine agents and business agents that serve as proxies for at least the subset of machines for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines, for efficiently optimizing industrial business operations (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and

C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet); and an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one of the components in the system and controls at least one component according to the desired operating point.

But Reid fails to clearly specify obtaining a system set point, an allowable range of operation and machine performance information; selecting a desired operating point within the allowable range of operation about the system set point according to performance characteristics associated with at least one of the components in the system; and controlling at least one component according to the desired operating point.

However, Hays teaches obtaining a system set point, an allowable range of operation and machine performance information; selecting a desired operating point within the allowable range of operation about the system set point according to performance characteristics associated with at least one component in the system; and controlling at least one component according to the desired operating point (C20 L56-58, note that in order to adjust and control the pump operation so that it could operate closer to the best efficient point, BEP, it is necessary to obtain a set point, an allowable range operation about the set point, and finally select an operating point within the allowable range. Note that the components of the system characterize the machine performance information and the allowable range of operation).

Reid and Hays are analogous art because they are from the same field of endeavor. They both relate to diagnostic systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

Please note that the limitations that Reid does not clearly teach are not properly linked with the limitations recited in the first portion of the claim. These limitations/steps are able to stand alone. Please see Item 11a of this office

action that indirectly addresses this issue. Furthermore note that in order to secure a desired operating characteristic and properly control a system it is necessary to obtain machine characteristic information and the allowable range of operation of the machine. It is known in this art that a system set point should be within the allowable range of operation and any other desired operating point should also be within the allowable range of operation. The allowable range of operation and the machine performance information of the system depends on the components that makeup the system.

b. **Regarding claim 2**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses a host computer that executes a prognostic engine (Fig 3 and C13 L24-43, see for example that the local expert are computer driven entities that serve as host and receive data from up to thirty-two different machines located at the site).

c. **Regarding claim 4**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses at least a subset of machines comprising prognostic components that collaborate in a distributed manner (Fig 2 and C8 L11-17 and C14 L10-15, see for example that the local experts communicate shared or individually; also see that the local experts could be mounted separate and apart from the respective machines or they could be mounted on each machine).

d. **Regarding claim 5**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses at least one prognostic component performs prognoses for a cluster of machines (Fig 1-2 and C2 L47-49 , note that a group of machines is being interpreted as a cluster of machines. See for example that the local expert is connected to thirty-two different machines).

e. **Regarding claim 6**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses a prognosis engine and a prognostic components collaborating to improve operating rate of at least a subset of a machines (C2 L57-61, see for example that the diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear and necessary maintenance in order to improve the operating rate of the machines).

f. **Regarding claim 8**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses at least a subset of machines and/or components are represented by intelligent agents (Fig 1-2, see for example that the intelligent software in the local expert represent the subset of machines).

- g. **Regarding claim 9**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses at least a subset of machines and/or components are physically located remote from one another (Fig 2 and C4 L53-62, note that this feature is inherent to the machines taught in Reid. Machines, such as engines and turbines, are located separate from one another; without coming into physical contact with each other. Also note that the site 12, as exemplified in Fig 1, includes a plurality of machines 14. The machines 14 may each be the same kind of machine or different machines).
- h. **Regarding claim 39**, Reid discloses an industrial automation layout methodology, comprising: analyzing machine related prognostic data (C3 L13-44 and C5 L3-21, see for example automatic collecting and analyzing data related to predicting a future condition); analyzing business concern data (C3 L20-25; note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business concern data); analyzing business objective data (C3 L20-25, note that identifying and recommending the replacement of a part of a machine is considered as a analyzing business objective data); specifying machine acquisition based at least in part upon the analyses (C3 L20-25, see for example specifying part numbers of the bearings that need to be replaced).

But Reid fails to clearly specify obtaining a system set point, an allowable range of operation and machine performance information; selecting a desired

operating point within the allowable range of operation about the system set point according to performance characteristics associated with at least one of the components in the system; and controlling at least one component according to the desired operating point.

However, Hays teaches obtaining a system set point, an allowable range of operation and machine performance information; selecting a desired operating point within the allowable range of operation about the system set point according to performance characteristics associated with at least one component in the system; and controlling the at least one component according to the desired operating point (C20 L56-58, note that in order to adjust and control the pump operation so that it could operate closer to the best efficient point, BEP, it is necessary to obtain a set point, an allowable range operation about the set point, and finally select an operating point within the allowable range. Note that the components of the system characterize the machine performance information and the allowable range of operation).

Reid and Hays are analogous art because they are from the same field of endeavor. They both relate to diagnostic systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

i. **Regarding claim 44**, Reid discloses a system that facilitates optimizing industrial business operations, comprising: a component that receives data relating to state of a subset of machines or components that are part of the industrial business operations (C3 L32-34, see for example data collecting and analyzing); a prognostics engine that infers future state of at least a subset of the operations based in part on the received data (C2 L54-64, note that the local experts are being interpreted as the "prognostic engine"; and a "forecast or prediction" is being interpreted as a "prognostic". The diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc), the prognostics engine comprising a plurality of intelligent software machine agents and business agents that serve as proxies for at least the subset of machines, for modeling and representing interactions with one another, and for facilitating convergence on modification and control of the subset of machines (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from

up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet).

But Reid fails to clearly specify an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one of the components in the system and controls at least one component according to the desired operating point.

However, Hays teaches an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one component in the system and controls at least one component according to the desired operating point (C20 L56-58, note that in order to adjust and control the pump operation so that it could operate closer to the best efficient point, BEP, it is necessary to obtain a set point, an allowable

range operation about the set point, and finally select an operating point within the allowable range. Note that the components of the system characterize the machine performance information and the allowable range of operation).

Reid and Hays are analogous art because they are from the same field of endeavor. They both relate to.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

Please note that the limitations that Reid does not clearly teach are not properly linked with the limitations recited in the first portion of the claim. These limitations/steps are able to stand alone. Please see Item 11a of this office action that indirectly addresses this issue Furthermore note that in order to secure a desired operating characteristic and properly control a system it is necessary to obtain machine characteristic information and the allowable range of operation of the machine. It is known in this art that a system set point should be within the allowable range of operation and any other desired operating point should also be within the allowable range of operation. The allowable range of operation and the machine performance information of the system depends on the components that makeup the system.

j. **Regarding claim 45**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses a prognostic engine infers future business conditions (C3 L20-25; note that the local expert identifying and recommending the replacement of a part of a machine is considered as inferring a future business condition).

k. **Regarding claim 47**, Reid discloses a system that facilitates optimizing industrial business operations, comprising: a component that receives data relating to state of the industrial business operations (C3 L32-34, see for example data collecting and analyzing); a prognostics engine that infers future state of at least a subset of the operations based in part on the received data (C2 L54-64, note that the local experts are being interpreted as the “prognostic engine”; and a “forecast or prediction” is being interpreted as a “prognostic”. The diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc), the prognostics engine comprising a plurality of intelligent software machine agents and business agents for modeling and representing interactions between the subset of machines, for efficiently optimizing industrial business operations (Fig 3 and C3 L20-25, C8

L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host).

But Reid fails to clearly specify an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one of the components in the system and controls at least one component according to the desired operating point.

However, Hays teaches an optimization component that selects a desired operating point as an optimum performance point within an allowable range of operation about a system set point according to performance characteristic associated with at least one component in the system and controls at least one component according to the desired operating point (C20 L56-58, note that in order to adjust and control the pump operation so that it could operate closer to

the best efficient point, BEP, it is necessary to obtain a set point, an allowable range operation about the set point, and finally select an operating point within the allowable range. Note that the components of the system characterize the machine performance information and the allowable range of operation).

Reid and Hays are analogous art because they are from the same field of endeavor. They both relate to diagnostic systems.

Reid and Hays are analogous art because they are from the same field of endeavor. They both relate to.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

Please note that the limitations that Reid does not clearly teach are not properly linked with the limitations recited in the first portion of the claim. These limitations/steps are able to stand alone. Please see Item 11a of this office action that indirectly addresses this issue. Furthermore note that in order to secure a desired operating characteristic and properly control a system it is necessary to obtain machine characteristic information and the allowable range of operation of the machine. It is known in this art that a system set point should be within the allowable range of operation and any other desired operating point

should also be within the allowable range of operation. The allowable range of operation and the machine performance information of the system depends on the components that makeup the system.

l. **Regarding claim 48**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses wherein an optimization component correlates component performance information associated with one ore more components in a system comprising at least a pump, a motor and a motor drive in order to derive correlated process performance information (This limitation is inherent to the system taught by Hays).

m. **Regarding claim 49**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses wherein an optimization component selects a desired operating point as an optimum performance point within an allowable range of operation according to a correlated process performance (this limitation is inherent to the system taught by Hays).

23. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays) and in view of Roemer et al., "Advanced

Diagnostics and Prognostics for Gas turbine Engine Risk Assessment", IEEE 2000 (hereinafter Roemer).

a. **Regarding claim 3**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above.

But the combination of Reid and Hays fails to clearly specify the prognostic engine comprising a classifier.

However, Roemer teaches a prognostic engine comprising a classifier (Figure 2, Page 346 C1 L1-24 and Page 347 C1 L1-5, see for example that the prognostic algorithm uses the diagnostic system. Note that the diagnostic system/algorithm has a classifier).

Reid, Hays and Roemer are analogous art because they are from the same field of endeavor. They all relate to diagnostic systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and Hays and combining them with the teachings disclosed by Roemer.

One of ordinary skill in the art would have been motivated to do this modification in order to reduce the life cycle costs as suggested by Roemer (see for example the Conclusion).

b. **Regarding claim 7**, the combination of Reid, Hays and Roemer discloses all the limitations of the base claims as outlined above. Roemer further discloses a classifier that performs a probabilistic analysis in connection with inference

(Figure2, Page 346 C1 L1-24 and Page 347 C1 L1-5, see for example that the prognostic algorithm uses the diagnostic system. Note that the diagnostic system/algorithm has a classifier. Also note that the diagnostic results will be combined with past history information to train real-time algorithms , such as a neural networks or real-time probabilistic models, to continuously update the projections on remaining life).

24. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays) and in view of Burris et al. U.S. Publication 2003/0208394 (hereinafter Burris).

a. **Regarding claim 46**, the combination of Reid and Hays discloses all the limitations of the base claims as outlined above.

But the combination of Reid and Hays fails to clearly specify the future business conditions comprising at least one of future raw materials and future product demand

However, Burris discloses future business conditions comprising at least one of future raw materials and future product demand (Claim 22 -- see for example predicting a demand for raw material).

Reid, Hays and Burris are analogous art because they are from the same field of endeavor. They all relate to supervisory control systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and Hays and combining them with the teachings disclosed by Burris.

One of ordinary skill in the art would have been motivated to do this modification in order to accurately perform a forecast as suggested by Burris (see for example Paragraph 0030).

25. Claims 10, 13, 15-17, 19-22, 24-29, 32-35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Soneda et al. U.S. Patent No. 6,619,111 (hereinafter Soneda) and in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays).

a. **Regarding claims 10 and 37**, Reid discloses all the limitations of the base claims as outlined above. Reid further teaches a method that optimizes assets in an industrial automation environment, comprising: receiving and analyzing in real-time data relating to diagnoses and prognoses of operational aspects of a subset of machines that are part of the industrial automation system (C3 L32-34, see for example data collecting and analyzing); modeling and representing interactions of the subset of machines, for facilitating convergence on modification and control of the subset of machines (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes

information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet); modifying asset utilization in the industrial automation system based at least in part as a function of the analyzed diagnostic and prognostic machine data (C3 L20-25, replacing a part of a machine based on data identified by the local expert is being considered a modifying asset utilization).

But Reid fails to clearly specify correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information; selecting a desired operating point as an optimum efficiency point within an allowable range of operation about a system set point according to the correlated system efficiency information. Reid further fails to specify controlling at least one machine according to the desired operating point.

However, Soneda discloses correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in

order to derive correlated system efficiency information; selecting a desired operating point as an optimum efficiency point within an allowable range of operation about a system set point according to the correlated system efficiency information (note that the motor input is being interpreted as motor efficiency information and pump flow is being interpreted as pump efficiency information; Fig 7- see for example correlating motor input and the pump flow in order to derive correlated speed efficient information; C7 L4-43 - see preparing correlation equations for each of the speeds; Fig 1, Fig 3, Fig 6, C7 L4-43 – see selecting the pump speed that is closer to the actual allowable plant speed according to the motor input and the pump flow).

Reid and Soneda are analogous art because they are from the same field of endeavor. They both relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Soneda.

One of ordinary skill in the art would have been motivated to do this modification in order to enable an operator to easily monitor a machine performance trend as suggested by Soneda (see for example, C9 L1-2).

The combination of Reid and Soneda fails to clearly specify controlling at least one machine according to the desired operating point.

However, Hays discloses controlling at least one machine according to a desired operating point (Fig 3, Fig 5a-e, Fig 6b and C9 L10-30, C19 L13-67 and

C20 L1-67, see for example controlling and adjusting a pump's operation closer to the best efficient point BEP using pump performance curves).

Reid, Soneda and Hays are analogous art because they are from the same field of endeavor. They all relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by the combination of Reid and Soneda and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

b. **Regarding claim 13**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses obtaining a system set point and an allowable range of operation from a user (C7, C8 and C9 L1-30).

c. **Regarding claim 15**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses wherein controlling a system according to a desired operating point comprises providing a motor speed signal to a motor drive according to the desired operating point (Fig 3, Fig 5a-e, Fig 6b and C9 L10-30, C19 L13-67 and

C20 L1-67, see for example controlling and adjusting a pump's operation closer to the best efficient point BEP using pump performance curves).

d. **Regarding claim 16**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses obtaining at least one of an efficiency information, an allowable range, and a system set point from a user (C7, C8 and C9 L1-30).

e. **Regarding claim 17**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses obtaining at least one of an efficiency information, an allowable range, and a system set point from a host computer via a network (C7, C8 and C9 L1-30).

f. **Regarding claim 19**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses wherein the at least one of an efficiency information, an allowable range, and a system set point is obtained via wireless communications (C7, C8 and C9 L1-30).

g. **Regarding claim 20**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further

discloses obtaining at least a portion of one of an efficiency information, an allowable range, and a system set point from prior operation of the system (this limitation is inherent to the system described in the Hays reference).

h. **Regarding claim 21-22 and 24-29**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. However, note that due to the unclear language of claim 21, as indicated above in Item #11d of this Office Action, it is not possible to determine the subject matter which the applicant regards as his invention. Therefore for purposes of art rejection these claims are being broadly interpreted and rejected under the same reasoning presented for base claim 10.

i. **Regarding claim 32**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Hays further discloses wherein selecting a desired operating point comprises measuring at least one process variable from a sensor associated with a system (see Abstract).

j. **Regarding claim 33**, Reid discloses a system that optimizes assets in an industrial automation environment, comprising: means for receiving and analyzing in real-time data relating to prognoses of operational aspects of

machines and/or business components that are part of the industrial automation system (C3 L32-34, see for example data collecting and analyzing); means for modeling and representing interactions between the machines and/or business components (Fig 3 and C3 L20-25, C8 L54-67, C9 L1-24 and C13 L24-43, see for example that the local expert is computer driven and receives data from up to thirty-two different machines located at the site. The local expert comprises an expert system that utilizes information specific to a machine connected thereto, as well as information relating to machines of the same type. Based on such information, the local expert ascertains which machines are operating normally, or are experiencing minor, moderate or severe problems. Since identifying and recommending replacement of a part of a machine is considered as a business decision, the software in the local expert is an intelligent software business agent. Note that in general terms an agent is an entity software used to communicate with the network control host and a proxy is a software that acts as a barrier between a network and the Internet); means for regulating a subset of the machines and/or business components based at least in part as a function of the analyzed diagnostic and prognostic machine data (C3 L20-25, replacing a part of a machine based on data identified by the local expert is being considered as regulating machines and/or business components).

But Reid fails to clearly specify means for correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency

information in order to derive correlated system efficiency information; means for selecting a desired operating point within an allowable range of operation about a system set point according to the correlated system efficiency information. Reid further fails to clearly specify means for controlling at least one machine according to the desired operating point.

However, Soneda discloses means for correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information; means for selecting a desired operating point within an allowable range of operation about a system set point according to the correlated system efficiency information (note that the motor input is being interpreted as motor efficiency information and pump flow is being interpreted as pump efficiency information; Fig 7- see for example correlating motor input and the pump flow in order to derive correlated speed efficient information; C7 L4-43 - see preparing correlation equations for each of the speeds; Fig 1, Fig 3, Fig 6, C7 L4-43 – see selecting the pump speed that is closer to the actual allowable plant speed according to the motor input and the pump flow).

Reid and Soneda are analogous art because they are from the same field of endeavor. They both relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Soneda.

One of ordinary skill in the art would have been motivated to do this modification in order to enable an operator to easily monitor a machine performance trend as suggested by Soneda (see for example, C9 L1-2).

The combination of Reid and Soneda fails to clearly specify controlling at least one machine according to the desired operating point.

The combination of Reid and Soneda fails to clearly specify means for controlling at least one machine according to the desired operating point.

However, Hays discloses means for controlling at least one machine according to a desired operating point (Fig 3, Fig 5a-e, Fig 6b and C9 L10-30, C19 L13-67 and C20 L1-67, see for example controlling and adjusting a pump's operation closer to the best efficient point BEP using pump performance curves).

Reid, Soneda and Hays are analogous art because they are from the same field of endeavor. They all relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by the combination of Reid and Soneda and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

k. **Regarding claim 34**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses comprising means for inferring future states of a subset of machines (C2 L54-64, note that the local expert(s) are being interpreted as the "prognostic engine". Note that the diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc).

l. **Regarding claim 35**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above. Reid further discloses comprising means for inferring future states of a subset of business components (C2 L54-64, note that the local expert(s) are being interpreted as the "prognostic engine". Note that the diagnoses performed by each local expert can be used to alert appropriate personnel of impending failure, wear such as bearing wear, necessary maintenance, etc. The system enables a local expert to initiate electronic mail messages and/or electronic pages to appropriate personnel indicating a machine failure or impending failure, a need for maintenance, etc).

26. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Soneda et al. U.S. Patent No. 6,619,111 (hereinafter Soneda) in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays) and in view of Eryurek et al U.S. Patent No. 6,795,798 (hereinafter Eryurek).

a. **Regarding claim 12**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above.

But the combination of Reid, Soneda and Hays fails to clearly specify employing an options based analysis in connection with asset management.

However, Eryurek discloses employing an options based analysis in connection with asset management (C9 L24-67, C10, C13, C18 L26-56, C34 L66-67, C356 L1-15, C40 L57-67 and C41 L1-48, more specifically see C10 L50-67- sending either the same or different sets of data to each of the user interface routines; and C9 L35-36 – providing maintenance data and device status information).

Reid, Soneda, Hays and Eryurek are analogous art because they are from the same field of endeavor. They all relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid, Soneda and Hays and combining them with the teachings disclosed by Eryurek.

One of ordinary skill in the art would have been motivated to do this modification in order to decrease the time required to recognize that an asset needs to be fixed as well as the time it takes to receive the parts necessary to provide corrective action with respect to maintenance issues as suggested by Eryurek (see for example, C13 L20-25).

b. **Regarding claim 23**, the combination of Reid, Soneda, Hays and Eryurek discloses all the limitations of the base claims as outlined above. Eryurek further discloses automatically ordering an asset via the Internet (C9 L63-67 and 10 L 1-18 and C13 L1-160-- see for example automatically ordering parts in combination with he predictive controller based on predictions or future needs).

27. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. U.S. Patent No. 6,298,308 (hereinafter Reid) in view of Soneda et al. U.S. Patent No. 6,619,111 (hereinafter Soneda) and in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays) and in view of Admitted Prior Art (hereinafter APA).

a. Regarding APA, please note that the Pages and Line numbers mentioned in this office action refer to the Original Specification of the Instant Application filed 09/30/03.

b. **Regarding claim 30**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above.

But the combination of Reid, Soneda and Hays fails to clearly specify wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises life expectancies of at least two of the motor, the pump, and the motor drive

However, APA discloses wherein a system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein a performance characteristics associated with a plurality of components in the system comprises life expectancies of at least two of the motor, the pump, and the motor drive (Page 3 Lines 7-31 and Page 4 Lines 1-6).

Reid, Soneda, Hays and APA are analogous art because they are from the same field of endeavor. They all relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by the combination of Reid, Soneda and Hays and combining them with the teachings disclosed by APA.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

c. **Regarding claim 31**, the combination of Reid, Soneda and Hays discloses all the limitations of the base claims as outlined above.

But the combination of Reid, Soneda and Hays fails to clearly specify wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises cost of operation associated with at least two of the motor, the pump, and the motor drive.

However, APA discloses wherein a system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein a performance characteristics associated with a plurality of components in the system comprises cost of operation associated with at least two of the motor, the pump, and the motor drive (Page 3 Lines 7-31 and Page 4 Lines 1-6).

Reid, Soneda, Hays and APA are analogous art because they are from the same field of endeavor. They all relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by the combination of Reid, Soneda and Hays and combining them with the teachings disclosed by APA.

One of ordinary skill in the art would have been motivated to do this modification in order to effectively determine the root cause for bearing failure of rotating equipment as suggested by Hays (see for example, C5 L54-56).

28. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimoto et al. U.S. Patent No. 5,034,945 (hereinafter Kimoto) in view of Roemer et al., "Advanced Diagnostics and Prognostics for Gas turbine Engine Risk Assessment", IEEE 2000 (hereinafter Roemer) and in view of Hays et al. U.S. Patent No. 6,330,525 (hereinafter Hays).

a. **Regarding claim 38**, Kimoto discloses a data packet adapted to be transmitted between at least two computer processes running on a machine-implemented system, comprising: a data field (Fig 5 elements 1 and 11 and C3 L28-48 – see for example a data packet and a data field)

But Kimoto fails to clearly specify that the information in the data field is information that regulates operation of a business component based at least upon prognostic data derived by a classifier performing a probabilistic analysis for future state of at least a subset of the operations concerning a machine or a component. Kimoto further fails to teach that the information in the data field is a

desired operating point selected within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the components in the system.

Note that the information located in the data field is descriptive material and does not alter how the data packet functions. Note that the data packet would be transmitted between two computers in the same manner regardless of the kind of information found in the data field.

However, Roemer discloses comprising information that regulates operation of a business component based at least upon prognostic data derived by a classifier performing a probabilistic analysis for future state of at least a subset of the operations concerning a machine or a component (Figure 2, Page 346 C1 L1-24 and Page 347 C1 L1-5, see for example that the prognostic algorithm uses the diagnostic system. Note that the diagnostic system/algorithm has a classifier. Also note that the diagnostic results will be combined with past history information to train real-time algorithms , such as a neural networks or real-time probabilistic models, to continuously update the projections on remaining life).

Kimoto and Roemer are analogous art because they are from the same field of endeavor. They both relate to transmitting information in computing systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Kimoto and combining them with the teachings disclosed by Roemer.

One of ordinary skill in the art would have been motivated to do this modification in order to suppress an increase of traffic as suggested by Kimoto (see for example, C2 L30-35).

The combination of Kimoto and Roemer fails to clearly specify that the information in the data field is a desired operating point selected within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the components in the system.

However, Hays discloses a desired operating point selected within an allowable range of operation about a system set point according to performance characteristics associated with at least one of the components in the system (Fig 4b, C20 L5-13 and C20 L56-58, see for example communication between two computers regarding the adjustment and control of the pump operation so that it could operate closer to the best efficient point, BEP. This adjustment include the desired operating point because in order to operate closer to the BEP it is necessary to obtain a set point, an allowable range operation about the set point, and finally select an operating point within the allowable range. Note that the components of the system characterize the machine performance information and the allowable range of operation).

Kimoto, Roemer and Hays are analogous art because they are from the same field of endeavor. They all relate to transmitting information in computing systems.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by the combination of Kimoto and Roemer and combining them with the teachings disclosed by Hays.

One of ordinary skill in the art would have been motivated to do this modification in order to suppress an increase of traffic as suggested by Kimoto (see for example, C2 L30-35).

29. Claims 40 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eryurek et al U.S. Patent No. 6,795,798 (hereinafter Eryurek) in view of Soneda et al. U.S. Patent No. 6,619,111 (hereinafter Soneda).

a. **Regarding claim 40**, Eryurek discloses a computer-implemented method for ordering parts and optimizing assets in an industrial automation environment, comprising: automatically receiving an analyzing data relating to a prognosis of a future state of a machine (note that any information associated/necessary for the prediction or the forecast of a machine state is being interpreted as data relating to a prognosis of a future state of a machine; C40-67 and C41 L1- 16 - see for example monitoring and analyzing by the ASP information of efficiency

parameters, costs of degradation, actual values versus predicted values, historical trending of equipment characteristics and deviation from design parameters);

automatically inferring a failure period for at least one part of the machine (C41 L1- 16 --see for example predicted operational characteristics);

automatically ordering a replacement for the at least one part prior to the inferred failure period (C9 L63-67 and 10 L 1-18 and C13 L1-160-- see for example automatically ordering parts in combination with the predictive controller based on predictions or future needs).

But Eryurek fails to clearly specify correlating component performance information associated with one or more components in the machine comprising a motor efficiency information, a pump efficiency information, and a motor drive efficiency information in order to derive correlated process performance information; and selecting a desired operating point as an optimum performance point within a allowable range of operation according to the correlated process performance information.

However, Soneda discloses correlating component performance information associated with one or more components in a machine comprising a motor efficiency information, a pump efficiency information, and a motor drive efficiency information in order to derive correlated process performance information; and selecting a desired operating point as an optimum performance point within a allowable range of operation according to the correlated process

performance information (note that the motor input is being interpreted as motor efficiency information, and pump flow is being interpreted as pump efficiency information; Fig 7- see for example correlating motor input and the pump flow in order to derive correlated speed efficient information; C7 L4-43 - see preparing correlation equations for each of the speeds; Fig 1, Fig 3, Fig 6, C7 L4-43 – see selecting the pump speed that is closer to the actual allowable plant speed according to the motor input and the pump flow).

Eryurek and Soneda are analogous art because they are from the same field of endeavor. They both relate to monitoring performance of a machine.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings disclosed by Reid and combining them with the teachings disclosed by Soneda.

One of ordinary skill in the art would have been motivated to do this modification in order to enable an operator to easily monitor a machine performance trend as suggested by Soneda (see for example, C9 L1-2).

b. **Regarding claim 41**, the combination of Eryurek and Soneda discloses all the limitations of the base claims as outlined above. Eryurek further discloses employing an options based scheme in connection with machine management (C9 L24-67, C10, C13, C18 L26-56, C34 L66-67, C356 L1-15, C40 L57-67 and C41 L1-48, more specifically see C10 L50-67- sending either the same or

different sets of data to each of the user interface routines; and C9 L35-36 – providing maintenance data and device status information).

c. **Regarding claim 42**, the combination of Eryurek and Soneda discloses all the limitations of the base claims as outlined above. Eryurek further discloses employing an options based scheme in connection with decision support (C9 L24-67, C10, C13, C18 L26-56, C34 L66-67, C356 L1-15, C40 L57-67 and C41 L1-48, more specifically see C10 L50-67- sending either the same or different sets of data to each of the user interface routines; and C9 L32-35– providing the business persons more complete or understandable information associated with the operation of the plant).

d. **Regarding claim 43**, the combination of Eryurek and Soneda discloses all the limitations of the base claims as outlined above. Eryurek further discloses employing an options based scheme in connection with asset optimization (C9 L24-67, C10, C13, C18 L26-56, C34 L66-67, C356 L1-15, C40 L57-67 and C41 L1-48, more specifically see C10 L50-67- sending either the same or different sets of data to each of the user interface routines; and C18 L343-57– optimization of the plant).

Conclusion

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is 571-272-3766. The examiner can normally be reached on Mon-Fri 10:00 am- 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Carlos Ortiz-Rodriguez
Patent Examiner
Art Unit 2123

May 11, 2009

/Kideest Bahta/
Primary Examiner, Art Unit 2123